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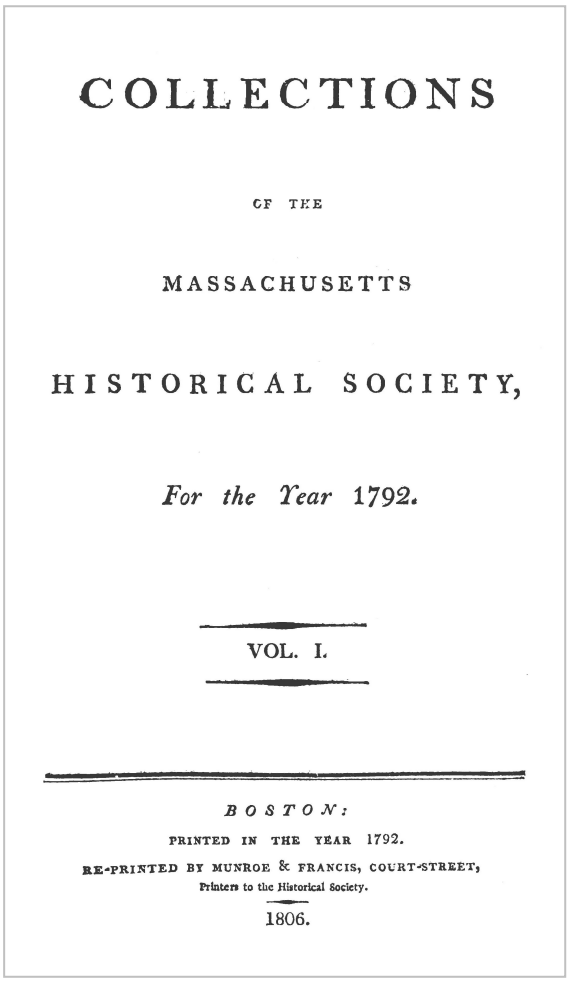

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Перевод на русский язык и оформление

2016
М. Теппоне,
"Истина сделает вас свободными"

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Следующее письмо было написано джентльменом, обладающим литературным талантом, на тему, которая несколько лет назад занимала умы многих людей. Можно предположит, что письмо это будет одинаково интересно и полезно.

Оно была адресовано Историческому обществу, и затем предложено на обозрение читателей, с выражением благодарности к уважаемому автору.

The following letter was written by a gentleman of literary character, upon a subject which had, for some years before, exercised the minds of people, and upon which much may be said equally useful and entertaining.

It was communicated lately to the Historical Society, and they now offer it to the public with every expression of respect to the worthy author.

Несмотря на необычность темноты, наблюдавшейся 19 мая 1780 года и привлекшей внимание многих людей в этой части страны, и описываемой многими авторами, обладавшими склонность к литературе, тем не менее, вы согласитесь со мной, что до настоящего времени мы не имеем удовлетворительного объяснения этого явления. Но это не означает, что такого объяснения не существует. Никто не предполагал, что оно имеет сверхъестественное происхождение, однако, отвергая невежественные и суеверные взгляды, необходимо дать рациональное и философское объяснение. Настоящее письмо представлено с полной открытостью, с которой истинный философ должен предпринимать свои скромные попытки распространять свои знания о природе, и объяснять ее процессы. И если оно не покажется удовлетворительным, то, по крайней мере, оно даст возможность вам сделать более успешную попытку.

Although the uncommon darkness which attracted the attention of all ranks of people in this part of the country, on the 19th May, 1780, was a phenomenon which several gentlemen of considerable literary abilities have endeavored to solve, yet I believe you will agree with me, that no satisfactory solution has yet appeared. But it does not thence follow, that none can be given. That it was supernatural was never supposed but by the ignorant and superstitious; it must then admit of a rational and philosophical explanation The following, therefore, is submitted to that candor with which a true philosopher will examine every modest attempt to extend our knowledge of nature, and to explain her operations. Should it not prove satisfactory, it may at least excite you to an attempt that shall be more successful.

Вам будет легко вспомнить, что перед началом тьмы, {95} небо было пасмурным и закрытым обычными тучами, а в некоторых местах шел легкий дождь. Между облаками и землей был еще один облачный пласт, имевший на вид очень большую толщину. По мере приближения этого слоя, началась темнота, и далее она усиливалась по мере заполнения пространства до самой высокой его части, в

результате чего небесный свод был перекрыт дважды. Необычная толщина этого второго пласта, вероятно, была вызвана движением сильного ветра на юг и на запад, и конденсацией паров, и движением их в северо-восточном направлении. Я помню, что это описание было сделано анонимным наблюдателем вскоре после событий в одном из публичных изданий вскоре после события.

You will readily recollect that previously to the commencement of the darkness, the sky was overcast with the common kind of clouds, from which there was, in some places, a light sprinkling of rain. Between these and the earth, there intervened another stratum, to appearance of very great thickness. As this stratum advanced, the darkness commenced, and increased with its progress till it came to its height; which did not take place till the hemisphere was a second time overspread. The uncommon thickness of this second stratum was probably occasioned by two strong currents of wind from the southward and westward, condensing the vapors, and drawing them in a northeasterly direction. I remember this observation was made by an anonymous writer in one of the public papers soon after the event.

Когда на следующий день я отправился из дома моего отца Роули (Rowley), чтобы присоединиться к моему полку в Нью-Джерси (New Jersey), я имел возможность увидеть то, что происходило в разных уголках штата, между местом моего пребывания и Пенсильванией. В результате опроса на моем пути, и после моего возвращения, было ясно, что темнота охватила большую часть графства Эссекс (Essex), нижнюю часть штата Нью-Гемпшир (New-Hampshire), и штат Мэн (Maine). В области Род-Айленде (Rhode-Island) и Коннектикуте (Connecticut), она была не столь выраженной, и еще меньше в Нью-Йорке. В Нью-Джерси второй слой облаков наблюдался, но он не был большой толщины, и тьма была не столь кромешной. Если моя память мне не изменяет, в нижней части Пенсильвании, никаких экстраординарных появлений замечено не было. По всему объему нижнего слоя имелся необычный медный оттенок, а земля и деревья были окрашены в очаровательный зеленый цвет, который не может остаться незамеченной, даже на фоне необычного мрака, окружающего наблюдателя. Это постепенное нарастание тьмы с юго-запада на северо-восток, соответствует движению облаков, и дает довольно веский аргумент в пользу моего предположения, что они были образованы ветрами {95}, двигающимися с двух разных направлений. Без всякого сомнения, именно эти два слоя облаков стали причиной мрачного дня. Теперь давайте рассмотрим, как это все происходило.

As I set out the next day, from my father's, in Rowley, to join my regiment in New Jersey, I had an opportunity to inform myself what were the appearances in different parts of the country, between here and Pennsylvania. The result of my inquiries on that journey, and after my return, was that the darkness was most gross in the county of Essex, the lower part of the State of New Hampshire, and the old Province of Maine. In Rhode Island and Connecticut it was not so great, and still less so in New York. In New Jersey, the second stratum of clouds was observed, but not of any great thickness; nor was the darkness very uncommon. In the lower parts of Pennsylvania, if my recollection does not fail me, no extraordinary appearance was noticed. Through this whole extent, the lower stratum had an uncommon brassy hue, while the earth and trees were adorned with so enchanting a verdure as could not escape notice, even amidst the unusual gloom that surrounded the spectator. This gradual increase of the darkness from southwest to northeast, which was nearly the course of the clouds, affords a pretty good argument in favor of the supposition, {95} that they were condensed by two

strong currents of wind, blowing in different directions. To these two strata of clouds we may, without hesitation, impute the extraordinary darkness of the day. Let us now examine how they affected it.

К сожалению, у нас нет способа точно сравнивать различную интенсивность света, которая имеется в различных случаях. Поэтому мы не можем точно вычислить пропорцию между светом в обычный дождливый день и в день ясного солнца. Вероятно, это и не столь важно, как можно предположить. Но мы можем сделать оценку, необходимую для наших расчетов, следующим образом.

We have, unhappily, no method of exactly comparing different degrees of light that will apply in all cases. We cannot, therefore, determine the proportion which the light of a common rainy day bears to that of the clear sun. It is probably not so considerable as may be supposed. We may make a kind of estimate of it, sufficient for our purpose, in the following way.

При поверхностном рассмотрении, мы можем предположить, что свет от *полной луны* гораздо меньше, чем от солнца, допустим, как один к тысяче. Но это предположение было чрезвычайно ошибочным, как мы сможем обнаружить даже при грубых расчетах. Свет, исходящий от светящегося тела, будет уменьшаться по мере удаления от самих объектов, всегда в обратном отношении квадратов этих расстояний. Луна удалена от земли на расстоянии, равном, примерно 217 ее полудиаметров, и если возвести это расстояние в квадрат, то получим более 47,000. Теперь предположим, что земля и луна во время последнего полнолуния были, на равном расстоянии от солнца, и получили от него свет в равных пропорциях; допустим также, что вся поверхность Луны была идеальным отражателем, что позволит нам дать точную пропорцию между светом солнца и полной луны. Другими словами, свет от солнца будет относиться к отраженному свету от луны, как 47,000 к 1. Но Луна, во время полнолуния, находится на более значительном отдалении от их общего источника света, чем земля, и должна, соответственно, получать меньше света. Далее, поверхность Луны, вместо того, чтобы быть *совершенным отражателем в каждой части, отражает, в лучшем случае, лишь весьма* несовершенно, и значительная часть ее поверхности, почти совсем не отражает. Учитывая эти факторы, мы можем предположить, что полная луна несет меньше света, чем солнце, в пропорции, примерно, 1 к 100 000.*

Upon a superficial consideration we should not, perhaps, suppose that the light of the *full moon* was in a much less proportion to that of the sun, than as that of one to one thousand. But this conjecture would be exceedingly erroneous, as will appear from the following rough calculation. The light proceeding from a luminous body is, at different distances, always in an inverse ratio of the squares of those distances. The moon is nearly 217 of her semi-diameters distant from the earth, the square of which number is a little above 47,000. Now supposing the earth and moon were, at the full of the latter, equidistant from the sun, and received equal proportions of light from him ; supposing also, that the surface of the moon was in every way a perfect reflector, the above number would give the exact proportion between the light of the

* Соотношение яркости Луны к Солнцу составляет примерно 1 к 398,110. Смотри: "10 вещей, которые вы не знали о Луне" http://www.infoniac.ru/news/10-veshei-kotorye-vy-ne-znali-o-Lune.html

sun and full moon. In other words, the light of the sun would be to that of the full moon as 47,000 to 1. But the moon at the full is considerably further distant from their common source of light than the earth is, and must receive less light in proportion. Further, the moon, instead of being a *perfect* reflector *in every part*, reflects at best very *imperfectly*, and from a considerable portion of her surface, scarce any at all. These things considered, we can not suppose that the light of the full moon bears a greater proportion to that of the sun than as 1 to 100,000.

Здесь мы сравнили два разных источника света, которые нам известны. Мы также можем сравнить свет, которым мы наслаждаемся в обычный дождливый день, и выяснить его соотношение со светом в других условиях. Однако об этом мы можем лишь домысливать, но нам не обязательно получить удовлетворение от наших расчетов. Мы можем предположить, что свет в обычный пасмурный день, еще до начала дождя, будет в 10 000 более ярким, чем при полной луне, или в 10 раз меньше, чем от солнца во время чистой атмосферы. Для того, чтобы удалить сомнения и представить эти данные, как постулат, возьмем еще другой способ, чтобы уточнить наш расчеты, который, возможно (если бы он пришел мне в голову раньше), исключил бы необходимость в предыдущем расчете. Предположим, что имеется герметично закрытое помещение, обращенное фронтальной стороной к солнцу, когда оно только выходит из-за горизонта; при отсутствии дверей, степень освещенности в нем будет пропорционально свету, который проникает через стекло окна (все остальные окна и двери были закрыты), находящегося на передней поверхности перпендикулярно к лучам солнца. Например, если поверхность стекла относится к остальной поверхности стены, как 1 к 8, то соотношение между освещенной частью внутренней стены и не освещенной будет иметь эту же пропорцию. Этот расчет сделан из предположения, что весь свет проникает через стекло без отражения (и поглощения), но это не факт, ибо значительная часть света будет отражаться от стекла; поэтому, вероятно, пропорция между освещенностью внутри комнаты и снаружи, будет примерно, как один к двенадцати {96}. Это очень большая диспропорция, но я верю, что вы допускаете, что это не намного больше, чем та, которую мы стараемся установить. Поэтому мы может рассматривать наш прежний постулат как подтвержденный. Отсюда следует, что *девять частей из десяти солнечных лучей отражаются от верхней поверхности общего слоя облаков, или были потеряны во время их прохождение через облака*. То, что сами отраженные лучи были очень яркими, можно судить по описанию свидетелей, которые отмечали сверкающую белизну на небольших участках между отдельными облаками, освещаемыми солнцем. Мы также можем легко понять, что большая часть лучей, которые проникают в облака, будут поглощены и потеряны в них, из-за бесконечного количества отражений и преломлений, которым они подвергаются во время прохода через облако. Лучи, которые все же пробиваются через облако, вероятно, претерпели почти столько же отражений и преломлений, как и те, которые были задержаны облаками. Поэтому

можно сделать естественный вывод, что их скорость значительно уменьшается ко времени выхода со стороны нижней поверхности облака; те причины, которые смогли остановить девять десятых лучей, должны существенным образом затормозить остальные, которые прошли через облака.

We have here compared two degrees of light, which are familiar to us. With these we can compare the light we enjoy in a common rainy day, which is equally so. This, however, can be only by conjecture, and it is not necessary for out1 purpose that it should be a very happy one. We will suppose the light of a common cloudy day, just before it rains, to be 10,000 times as great as the full moon or 10 times less than that of the sun in a clear atmosphere. To put it beyond a doubt, however, that this is a modest postulatum, we will take another method to ascertain it, which, perhaps, (had it struck my mind sooner,) might have precluded the necessity of the preceding calculation. Supposing a tight room to face the sun when at a small height above the horizon, the degree of light in it will bear the same proportion to the light without doors, as the glass in that front (all other windows and doors being closed,) bears to a section of the room perpendicular to the sun's rays. For instance, if the glass is to the perpendicular section as 1 to 8, the light in the room would bear that proportion to the light without. This, however, is upon the supposition that the glass should transmit all the incident rays, which is not the fact; for a very considerable part of them is reflected; probably such a proportion as to reduce the light in the room to a twelfth part of that without doors {96}. A very great disproportion this; but I believe you will allow, that it is not much greater than that which we have been endeavoring to ascertain. We will, therefore, consider the postulatum as established. It will then follow, that *nine parts in ten of the sun's rays are reflected from the upper surface of a common stratum of clouds, or lost in their passage through it*. That the reflected rays are very copious, will appear by the resplendent whiteness of small detached clouds, when strongly illuminated by the sun. We can also easily conceive, that a large part of the rays, which enter the clouds, will be absorbed and lost in them, when we consider the infinite number of reflections and refractions they must suffer in their passage. The rays which make their way through, probably suffer nearly as many reflections and refractions as those which are stopped. It is, therefore, natural to conclude, that their velocity is greatly diminished at the time of their exit from the lower surface of the clouds; for the causes that were able to stop nine-tenths of the rays must necessarily have greatly retarded the rest.

Теперь предположим, что второй слой облаков, находящийся между верхним слоем и землей, имеют значительную толщину и плотность, как это произошло в день упоминаемого нами 19-го мая. Те лучи, которым удалось пройти сквозь первый слой, были не только лишены значительной части своей скорости, но произошло изменение их первоначального направления, поэтому они должны были упасть на второй слой под косым углом. Это предполагает, что гораздо большее количество лучей, по сравнению с прямым углом падения, будет отражено от верхней поверхности нижнего слоя облаков, которые входят в ее состав. Остальным придется проникать через очень толстый и плотный слой паров, со скоростью, значительно сниженной, и они не имеют достаточного импульса для преодоления сопротивления, с которым они сталкиваются, с учетом многочисленных отражений и преломлений, которые они встретили на своем пути, и, следовательно, они не смогли преодолеть этот путь. Это не кажется странным, что, если девять десятых частей падающих лучей, имевших немыслимо высокую начальную скорость, тем не менее, не смогли проникнуть и были потеряны при прохождении верхнего слоя облаков, то оставшаяся часть должна была не усилиться, а вообще потеряться в слое пара (если можно так сказать), во время преодоления препятствий на своем пути. Чудо заключается в том, что некоторым из лучей все же удалось проникнуть через облака. Очень маленькой части лучей все же повезло. Этого было достаточно для формирования очертаний наземных объектов; при этом наблюдался лишь

желтоватый оттенок листвы и травы, вместо естественного для них зеленого цвета, который является составным, и это придало им необычно красивый оттенок.

Now let us suppose a second stratum of clouds, thick and compact, to intervene between the first and the earth, as happened on the memorable 19th of May. The rays that fortunately effected their passage through the first, were not only deprived of a great part of their velocity, but turned out of their direct course, so that they must have struck upon the second very obliquely. By this means a much larger proportion of them than common was reflected from the upper surface of the clouds that composed it. The rest having to penetrate a very thick and compact body of vapors, with a velocity exceedingly diminished, had not a sufficiency of momentum to overcome the resistance they had to encounter from the numerous reflections and refractions they met with, and were consequently lost in their passage. Nor will it appear strange, that, when nine-tenths of the incident rays, while proceeding with their inconceivable native velocity, were lost in passing a common stratum of clouds, the remainder should be so generally lost in such a body of vapor as then opposed their progress, after they had been so fatigued and tamed (if I may borrow the expression) in their struggles to force a passage through the first obstacle. The wonder is much greater, that any of them were able to penetrate. 'Tis certain, however, that a small proportion were so fortunate. These were sufficient to render terrestrial objects visible, while their yellow hue thrown upon the foliage and herbage diminished the intensity of their natural green, which is a compound colour, and gave them the resplendent and beautiful tint they exhibited.

Тьма в этот вечер, вероятно, была настолько ужасной, какой не было с того времени, когда Всемогущим сотворил свет. Было желание ее потрогать, как будто она была такой же необычной, какую наблюдали в Египте во времена Моисея. И поскольку тьмы не существует, но она лишь отражает отсутствие, поэтому ее осязаемость, описанная святым историком, должна была возникнуть из какой-то особенности, связанной с атмосферой, возможно, это очень густой пар или туман, сопровождавший ее. Я не могу помочь с осмыслением той тьмы, поскольку она выглядит еще более темной по сравнению с той, которую можно было бы наблюдать, если все светящиеся тела во Вселенной была окутана непроницаемой темнотой, или вовсе перестали существовать. Лист белой бумаги, находящейся на расстоянии в нескольких дюймах от глаз, {97} был столь же невидимый, как самый черный бархат. Учитывая малое количество света, которое проникло через облака в течение дня, неудивительно, что ночью, эта крайняя малость лучей была не способна пройти через тот же непрозрачный слой, находящийся в постоянном движении из-за меняющегося ветра, превращающийся в более эффективный не проницаемой слой, чем любые объекты, обладающие наибольшей отражающей способностью.

The darkness of the following evening was probably as gross as has ever been observed since the Almighty fiat gave birth to light. It wanted only palpability to render it as extraordinary as that which overspread the land of Ægypt in the days of Moses. And as darkness is not substantial, but a mere privation, the palpability ascribed to that by the sacred historian must have arisen from some peculiar affection of the atmosphere, perhaps an exceeding thick vapour, that accompanied it. I could not help conceiving at the time, that if every luminous body in the universe had been shrouded in impenetrable shades, or struck out of existence, the darkness could not have been more complete. A sheet of white paper, held within a few inches of the eyes, {97} was equally invisible with the blackest velvet. Considering the small quantity of light that was transmitted by the clouds, by day, it is not surprising that, by night, a sufficient quantity of rays should not be able to penetrate the same strata, brought back by the shifting of the winds, to afford the most obscure prospect even of the best reflecting bodies.

Как вы видите, при объяснении явления, я предположил, что причиной тьмы было тормозящее влияние паров, образующих облака; иными словами, лучи света претерпевали многократное уменьшение скорости в результате их отражения и

преломления, которые происходили в процессе движения через облака. Этот эффект является естественным результатом совершенной упругость отражающих тел. Ибо, если мы предположим совершенную упругость лучей света (которая, впрочем, еще не доказана), и допустим их движение через пар, формирующий облака, то их скорость должна уменьшиться, тем более, после их отражения. Если бы можно было сказать, что свет отражается от тел не из-за падения на них, а в результате взаимного отталкивание между ними, то выраженность их торможения была бы значительно выше; однако такой принцип взаимодействия трудно представить, поэтому движение лучей света полностью прекратилось, несмотря на тот мощный первоначальный импульс, который они получили от своего источника – солнца. Если это не так, то определенное количество отражений света должно быть достаточным, чтобы скорость лучей света упала до состояния покоя; и те лучи, которые все же прошли сквозь облака, при выходе из них, следовали со скоростью еще более или менее пониженной, пропорционально числу отражений, которые произошли на их пути. Вероятно, преломления на пути следования тоже могут произвести подобный эффект.

In framing this solution, you will observe that I have supposed a retarding power in the vapors that compose the clouds; in other words, that the rays of light suffer a great diminution of velocity from the reflections and refractions which they meet with in their passage. This effect necessarily results from a want of perfect elasticity in reflecting bodies. For should we suppose a perfect elasticity in the rays of light, (of which, however, we have no proof,) and allow a want of it in the vapours of which the clouds are formed, their velocity must be less after the reflection than before. Should it be said that light is reflected from bodies, not by infringing upon them, but by a principle of mutual repellency between them, the probability of their suffering a retardation will be much increased; because it is hardly conceivable that this principle, after having entirely destroyed the motion of light, should give it as great an impulse as it first received from its source, the sun. If it does not, then a certain number of reflections must be sufficient to reduce the rays to a state of perfect quiescence; and those, which make their way through, must, at their exit from the clouds, proceed with a velocity more or less diminished, in proportion to the number of reflections they have encountered. It is probable the refractions may also produce a similar effect.

Таким образом, сэр, я изложил вам свой взгляд на события, которые имели место во время тьмы 19 мая. Если мои принципы мне позволят, я буду польщен надеждой, что мое объяснение не покажется вам совершенно не философским. Если же, после полной и тщательной экспертизы, вы увидите причину, чтобы отклонить мое объяснение, то я буду вам признателен, если вы сообщите мне причины, которые побудят вас сделать это; и, пожалуйста, сообщите мне лучшее объяснение.

Thus, Sir, I have given you my ideas of the manner, in which the extraordinary darkness on the 19th of May was produced. If my principles are allowed, I flatter myself the solution will not appear to you altogether unphilosophical. If, however, upon a full and candid examination, you should see cause to reject it, I will thank you to communicate the reasons which lead you to do it; and, if you please, to give me a better.

Я имею честь,
Сэр, с большим уважением,
Ваш почтенный слуга

Эксетер, декабрь, 1785

Самуэль Тени

I have the honour to be,
Sir, with high esteem,
Your most servant

Exeter, Dec. 1785
To _____

Samuel Tenney

{98}

COLLECTIONS

OF THE

MASSACHUSETTS

HISTORICAL SOCIETY,

For the Year 1792.

VOL. I.

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1806.

The following letter was written by a gentleman of literary character, upon a subject which had, for some years before, exercised the minds of people, and upon which much may be said equally useful and entertaining.

It was communicated lately to the HISTORICAL SOCIETY, *and they now offer it to the public with every expression of respect to the worthy author.*

DR. TENNEY'S LETTER ON THE DARK DAY, MAY 19, 1780.

DEAR SIR,

ALTHOUGH the uncommon darkness, which attracted the attention of all ranks of people in this part of the country, on the 19th of May, 1780, was a phenomenon which several gentlemen of considerable literary abilities have endeavoured to solve, yet I believe you will agree with me that no satisfactory solution has yet appeared. But it does not thence follow that none can be given. That it was supernatural was never supposed but by the ignorant and superstitious; it must then admit of a rational and philosophical explanation. The following therefore is submitted to that candor, with which a true philosopher will examine every modest attempt to extend our knowledge of nature, and to explain her operations. Should it not prove satisfactory, it may at least excite you to an attempt that shall be more successful.

You will readily recollect that, previously to the commencement of the darkness, the sky was overcast with the common kind of clouds, from which there was, in some places, a light sprinkling of rain. Between these and the earth there intervened another stratum, to appearance, of very great thickness. As this stratum advanced, the darkness commenced, and increased with its progress till it came to its height; which did not take place till the hemisphere was a second time overspread. The uncommon thickness of this second stratum was probably occasioned by two strong currents of wind from the southward and westward, condensing the vapours and drawing them in a north-easterly direction. I remember this observation was made by an anonymous writer in one of the public papers soon after the event.

As I set out the next day, from my father's at Rowley, to join my regiment in New-Jersey, I had an opportunity to inform myself what were the appearances in different parts of the country between here and Pennsylvania. The result of my inquiries, on that journey, and after my return, was that the darkness was most gross in the county of Essex, the lower part of the state of New-Hampshire and the old Province of Maine. In Rhode-Island and Connecticut it was not so great, and still less in New-York. In New-Jersey the second stratum of clouds was observed, but not of any great thickness; nor was the darkness very uncommon. In the lower parts of Pennsylvania, if my recollection does not fail me, no extraordinary appearance was noticed. Through this whole extent the lower stratum had an uncommon brassy hue, while the earth and trees were adorned with so enchanting a verdure as could not escape notice, even amidst the unusual gloom that surrounded the spectator. This gradual increase of the darkness from southwest to northeast, which was nearly the course of the clouds, affords a pretty good argument in favour of the supposition, that

that they were condensed by two strong currents of wind blowing in different directions. To these two strata of clouds we may, without hesitation, impute the extraordinary darkness of the day. Let us now examine how they effected it.

We have, unhappily, no method of exactly comparing different degrees of light, that will apply in all cases. We cannot therefore determine the proportion which the light of a common rainy day bears to that of the clear sun. It is probably not so considerable as may be supposed. We may make a kind of estimate of it, sufficient for our purpose in the following way.

Upon a superficial consideration we should not perhaps, suppose that the light of the *full moon* was in a much less proportion to that of the sun than as 1 to 1000. But this conjecture would be exceedingly erroneous, as will appear from the following rough calculation. The light proceeding from a luminous body is, at different distances, always in an inverse ratio of the squares of those distances. The moon is nearly 217 of her semi-diameters distant from the earth, the square of which number is a little above 47,000. Now supposing the earth and moon were, at the full of the latter, equidistant from the sun, and received equal proportions of light from him ; supposing also that the surface of the moon was in every part a perfect reflector, the above number would give the exact proportion between the light of the sun and full moon. In other words, the light of the sun would be to that of the full moon as 47,000 to 1. But the moon at the full is considerably further distant from their common source of light than the earth is, and must receive less light in proportion. Further, the moon instead of being a *perfect* reflector *in every part*, reflects at best, but very *imperfectly*, and from a considerable proportion of her surface, scarce *any* at all. These things considered, we cannot suppose that the light of the full moon bears a greater proportion to that of the sun than as 1 to 100,000.

We have here compared two degrees of light which are familiar to us. With these we can compare the light we enjoy in a common rainy day, which is equally so. This, however, can be only by conjecture ; and it is not necessary for our purpose that it should be a very happy one. We will suppose the light of a common cloudy day, just before it rains, to be 10,000 times as great as that of the full moon, or 10 times less than that of the sun in a clear atmosphere. To put it beyond a doubt, however, that this a modest postulatum, we will take another method to ascertain it, which perhaps (had it struck my mind sooner) might have precluded the necessity of the preceding calculation. Supposing a tight room to face the sun when at a small height above the horizon, the degree of light in it will bear the same proportion to the light without doors, as the glass in that front (all other windows and doors being closed) bears to a section of the room perdendicular to the sun's rays. For instance, if the glass is to the perdendicular section as 1 to 8, the light in the room would bear that proportion to the light without. This, however, is upon the supposition that the glass should transmit all the incident rays, which is not fact ; for a very considerable part of them is reflected ; probably such a proportion as to reduce the light in the room to a twelfth part of that without doors.

A very

A very great disproportion this; but I believe you will allow, that it is not much greater than that which we have been endeavouring to ascertain. We will therefore consider the postulatum as established. It will then follow, that *nine parts in ten of the sun's rays are reflected from the upper surface of a common stratum of clouds*, or *lost in their passage through it*. That the reflected rays are very copious, will appear by the resplendent whiteness of small detached clouds, when strongly illuminated by the sun. We can also easily conceive that a large part of the rays, which enter the clouds, will be absorbed and lost in them, when we consider the infinite number of reflections, and refractions they must suffer in their passage. The rays, which make their way through, probably suffer nearly as many reflections and refractions, as those which are stopped. It is therefore natural to conclude that their velocity is greatly diminished at the time of their exit from the lower surface of the clouds: For the causes that were able to stop nine tenths of the rays must necessarily have greatly retarded the rest.

Now let us suppose a second stratum of clouds, thick and compact, to intervene between the first and the earth, as happened on the memorable 19th of May. The rays, that fortunately effected their passage through the first, were not only deprived of a great part of their velocity, but turned out of their direct course, so that they must have struck upon the second very obliquely. By this means a much larger proportion of them than common was reflected from the upper surface of the clouds that composed it. The rest having to penetrate a very thick and compact body of vapours, with a velocity exceedingly diminished, had not a sufficiency of momentum to overcome the resistance, they had to encounter from the numerous reflections and refractions they met with, and were consequently lost in their passage. Nor will it appear strange, that, when nine tenths of the incident rays, whilst proceeding with their inconceivable native velocity, were lost in passing a common stratum of clouds, the remainder should be so generally lost in such a body of vapour as then opposed their progress, after they had been so fatigued and tamed (if I may borrow the expressions) in their struggles to force a passage though the first obstacle. The wonder is much greater, that any of them were able to penetrate. 'Tis certain, however, that a small proportion were so fortunate. These were sufficient to render terrestrial objects visible, while their yellow hue thrown upon the foliage and herbage diminished the intensity of their natural green, which is a compound colour, and gave them the resplendent and beautiful tint they exhibited.

The darkness of the following evening was probably as gross as ever has been observed since the Almighty fiat gave birth to light. It wanted only palpability to render it as extraordinary, as that which overspread the land of Ægypt in the days of Moses. And as darkness is not substantial, but a mere privation, the palpability ascribed to that by the sacred historian must have arisen from some peculiar affection of the atmosphere, perhaps an exceeding thick vapour, that accompanied it. I could not help conceiving at the time, that if every luminous body in the universe had been shrouded in impenetrable shades, or struck out of existence, the darkness could not have been more complete. A sheet of white paper held within a few inches of the eyes,

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I have the honour to be,
Sir, with high esteem,
Your most obedient and humble servant,

Exeter, Dec. 1785.

To———— SAMUEL TENNEY.

A letter from the Town Clerk of Dorchester *to the Secretary of the* Historical Society.

SIR,

IN the beginning of the year 1630, reckoning the year to begin with January, a congregational church was gathered at Plymouth in England, and the Rev. John Maverick, and the Rev. John Warham, were separated to the care of the said church. March 20th 1630, the aforesaid Mr. Maverick and Warham, sailed from Engand, with many godly families and persons. They arrived at Nantasket, May 30th, 1630, where Capt. S———— puts them ashore and leaves them to shift for themselves; some of them get a boat of some old planters, and go up Charles' river, till it grows narrow and shallow; there,